

### Why should I use insect repellents?

Insect repellents help people avoid mosquito and/or tick bites. Avoiding mosquito and tick bites can prevent Eastern equine encephalitis, West Nile virus, Lyme disease and other illnesses that can be transmitted by mosquitoes and ticks.

### When should I use insect repellents?

Apply mosquito repellent when you are going to be outdoors between dawn and dusk or at other times when mosquitoes are active. Apply tick repellent when you will be in wooded, brushy, or grassy places where ticks may live.

### Which repellents should I use?

Use repellents that are registered by the Environmental Protection Agency (EPA) because those products have been evaluated for safety and effectiveness. Look for the EPA-registration number on the label. Read the label carefully to make sure the product is effective against the type of insect you wish to repel. The label may also contain important information about how to use the product safely.

Most of the EPA-registered mosquito or tick repellent products contain one of the following ingredients:

**DEET** (N, N-diethyl-meta-toluamide) is an ingredient used to repel mosquitoes and ticks. DEET has been tested against a variety of biting insects and has been shown to be very effective. Keep in mind that a higher percentage of DEET in a repellent does not mean that your protection is better—just that it will last longer.

- Do not use DEET on infants younger than two months old.
- Do not use DEET in concentrations greater than 30%. Higher concentrations are not more effective and are usually unnecessary.
- DEET is safe for children in concentrations up to 30%.

**Picaridin** (KBR 3023) is a colorless, nearly odorless liquid active ingredient that is used as an insect repellent against biting flies, mosquitoes, chiggers, and ticks. Picaridin-containing products were sold in Europe and Australia for several years before being introduced to the U.S. market in 2005.

**Oil of lemon eucalyptus** is found naturally in eucalyptus leaves and twigs. It was first registered in 1948 as an insecticide and miticide (kills insects and mites) and today is found in both lotion and spray insect repellents. **p-Mentane-3,8-diol** is the chemically synthesized version of oil of lemon eucalyptus. The label on these products specifies that they should not be used on children under the age of three years.

**IR3535** (3-[N-Butyl-N-acetyl]-aminopropionic acid, ethyl ester) is used as an insect repellent against mosquitoes, deer ticks and biting flies. This biopesticide was registered with the EPA as an active ingredient in 1999. IR3535 has been used as an insect repellent in Europe for 20 years with no significant harmful effects.

### Repellents for use on clothing:

**Permethrin** is an insecticide and insect repellent that can be used on clothing, shoes, bed nets, and camping gear. Permethrin should never be applied to skin. Permethrin-treated clothing repels and kills ticks, mosquitoes, and other insects and retains this effect after laundering. This may be a good choice for people who spend significant time outside.

Products containing **DEET** can also be applied to clothing.

## How long do repellents work?

Length of protection varies with the amount of active ingredient, air temperature, amount of physical activity and perspiration, water exposure and other factors. Re-apply repellents according to label instructions.

## Are insect repellents safe?

Yes, products containing DEET, Picaridin, oil of lemon eucalyptus, IR3535, and permethrin are safe when used according to the directions on the label. Each of these ingredients has been registered with the EPA. EPA registration of repellent active ingredients indicates the materials have been reviewed and approved for efficacy and human safety when applied according to the instructions on the label.

## How should insect repellents be applied safely?

Carefully follow the directions on the label.

- Apply repellents only to exposed skin and/or clothing (as directed on the product label.) Do not use repellents under clothing.
- Never use repellents over cuts, wounds or irritated skin.
- Do not apply to eyes or mouth, and apply sparingly around ears. When using sprays, do not spray directly on face - spray on hands first and then apply to face.
- Do not allow children to handle the product. When using on children, apply to your own hands first and then put it on the child. Avoid applying repellents to children's hands.
- Use just enough repellent to cover exposed skin and/or clothing. Heavy application and saturation are generally unnecessary for effectiveness. If biting insects do not respond to a thin film of repellent, apply a bit more.
- After returning indoors, wash treated skin with soap and water or bathe. This is particularly important when repellents are used repeatedly in a day or on consecutive days. Also, wash treated clothing before wearing it again. (This precaution may vary with different repellents—check the product label.)
- If you or your child develops a rash or other bad reaction from an insect repellent, stop using the repellent, wash the repellent off with mild soap and water, and call a local poison control center for further guidance. If you go to a doctor because of the repellent, take the repellent with you to show the doctor.

## Are there other insect repellents that are effective?

There are other repellent products that can be applied directly to skin which provide some protection from mosquito bites. However, studies suggest that other products do not offer the same level or duration of protection as products containing DEET, Picaridin, oil of lemon eucalyptus, or IR3535.

People should choose a repellent that they will use consistently and that will provide sufficient protection for the amount of time that they will be spending outdoors. Product labels often indicate the length of time that protection can be expected from a product. Persons who are concerned about using insect repellents may wish to consult their health care provider for advice.

## Additional Resources

Centers for Disease Control and Prevention:

[http://www.cdc.gov/ncidod/dvbid/westnile/qa/insect\\_repellent.htm](http://www.cdc.gov/ncidod/dvbid/westnile/qa/insect_repellent.htm)

Environmental Protection Agency: <http://cfpub.epa.gov/oppref/insect/>